

SURVEILLANCE WEEK 48 (November 29, 2009– December 5, 2009)

This issue of the Ontario Influenza Bulletin provides information on the surveillance period from November 29, 2009-December 5, 2009, (Week 48). **All data are for week 48 unless otherwise specified. Death and hospitalization information among pandemic (H1N1) 2009 (abbreviated as pH1N1) confirmed cases is current as of December 9, 2009.** Data extraction and analysis for this issue of the Bulletin occurred on December 9, 2009.

In order to enable our readers to better assess influenza activity in Ontario, we have combined various sources of information in the following table.

Assessment of Influenza Activity in Ontario

Measure	Assessment of measure compared to previous week (Lower, Similar, Higher)	Reasoning behind assessment
Laboratory Confirmed Cases	Lower	95 total influenza cases (87 pH1N1) in week 48 compared to 403 reported in week 47 (237 pH1N1)*. The percent positivity of laboratory tests for influenza A was 5.0%, which is lower than in week 47 (7.0%).
Influenza A Outbreaks	No change	No new institutional influenza outbreaks were reported for the current reporting week.
Influenza Activity Levels Reported by Health Units	Lower	Four health units reported 'localized' activity and twenty reported 'sporadic' activity for the current reporting week.
ILI Consultation Rate reported by Sentinel Physicians	Lower	The overall ILI consultation rate decreased from 40.36/1,000 patient visits to 22.27/1,000 patient visits.
Hospitalizations Among Lab Confirmed Cases of pandemic (H1N1) 2009 virus	Lower	Fewer hospitalized cases were reported from December 3 to December 9 as compared to November 26 to December 2 (69 compared to 115).
Deaths Among Lab Confirmed Cases of pandemic (H1N1) 2009 virus	No change	Nine new deaths were reported from December 3 to December 9. This is the same number of deaths reported from November 26 to December 2.
OVERALL ASSESSMENT	Influenza activity in Ontario is <i>lower</i> compared to the previous week.	The indicators show that influenza activity was lower in week 48 compared to week 47. Starting in week 45 (Nov.8-14) influenza activity in Ontario has declined each week.

*Counts from previous weeks may be updated and therefore may not match reports in earlier Bulletins

Overall, influenza activity in Ontario during week 48, 2009, was **lower** when compared to week 47, 2009. Ontario health units reported 95 new confirmed cases of influenza through the integrated Public Health Information System (iPHIS). This count includes 87 laboratory confirmed cases of pH1N1. During week 48, new laboratory confirmed cases of pH1N1 continued to be seen in all regions of Ontario. No new institutional influenza outbreaks were reported. For week 48, four health units reported localized influenza activity, twenty health units reported sporadic activity, and the remaining health units reported no influenza activity or did not report. The rate of influenza-like illness (ILI) in patients seen by sentinel physicians has now decreased to what is expected for this time of the year based on the average ILI rate reported in week 48 from previous years.

For a definition of ILI activity levels and links to websites providing current influenza information from other sources, please refer to the attached Appendix- I. If you would like to provide feedback on the Bulletin, please contact Christine D'Souza (christine.dsouza1@ontario.ca, 416-212-5323) or Michael Whelan (michael.whelan@ontario.ca, 416-327-9174).

Table 1: Summary of confirmed influenza cases and institutional influenza outbreaks by health region (Week 48, 2009-2010)

Confirmed influenza cases*†	HEALTH REGION							TOTAL
	North West	North East	Eastern	Central East	Toronto	South West	Central West	
Pandemic (H1N1) 2009	1	3	7	22	29	11	14	87
Influenza A (Not Subtyped)	0	0	0	2	2	0	4	8
Influenza A (Seasonal H1/H3)	0	0	0	0	0	0	0	0
Influenza A (Indeterminate pH1N1/ unsubtypeable)	0	0	0	0	0	0	0	0
Influenza B	0	0	0	0	0	0	0	0
Influenza A & B	0	0	0	0	0	0	0	0
Total new cases	1	3	7	24	31	11	18	95
Institutional outbreaks of pandemic (H1N1) 2009 ‡	0	0	0	0	0	0	0	0
Institutional outbreaks of Influenza (Other Subtypes/Not Subtyped)‡	0	0	0	0	0	0	0	0

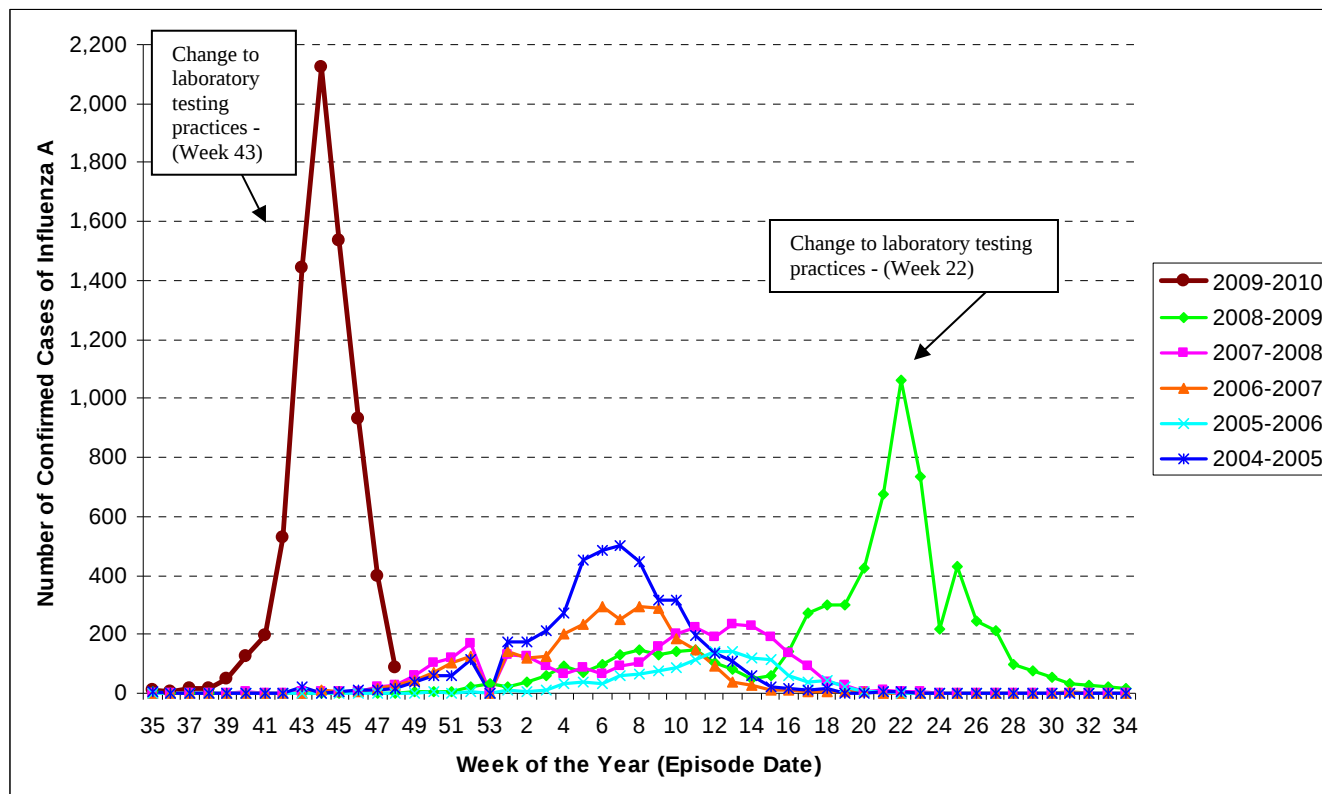
SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [09/12/2009].

* Includes reports of confirmed influenza through iPHIS, as well as cases in institutional outbreaks, with dates of onset for the first case in the surveillance period.

‡ Confirmed outbreaks in institutions with onset date of symptoms during the surveillance period.

The number of laboratory confirmed cases of influenza A reported to date in the 2009-2010 season is much higher than in the previous five seasons at this time (Figure 1). The number of influenza A cases reported during the second wave began to increase in early September, with a maximum number of cases reported in week 44 (November 1 -7). The number of cases reported in each of weeks 43-45 in the second wave of the pandemic was higher than the maximum for any week observed in the first wave. The maximum case volume observed to date in the 2009-2010 season has exceeded the maximum case volume in all of the past five influenza seasons.

Figure 1: All confirmed cases of Influenza A in Ontario by week, 2004-2010^{†*}



SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [09/12/2009].

[†] Episode Date for a case corresponds to the earliest date on record for the case according to the iPHIS hierarchy (Symptom Date > Clinical Diagnosis Date > Specimen Collection Date > Lab Test Date > Reported Date)

Table 2: Laboratory confirmed cases of pandemic (H1N1) 2009 virus by health unit & health region, reported during Week 48[†], 2009-10, wave two, wave one, and cumulative* confirmed cases between April 1, 2009 – December 5, 2009

Region	Health Unit	Confirmed pH1N1			
		Current week (WK 48)	Wave 2 (WK 35-current)	Wave 1 (WK 15-WK 34)	Total cumulative
North West	Northwestern	1	73	74	147
	Thunder Bay District	0	86	10	96
	TOTAL NORTH WEST	1	159	84	243
North East	Algoma	0	60	6	66
	North Bay Parry Sound District	1	48	7	55
	Porcupine	1	106	4	110
	Sudbury & District	1	44	24	68
	Timiskaming	0	53	0	53
	TOTAL NORTH EAST	3	311	41	352
Eastern	City of Ottawa	6	413	359	772
	Eastern Ontario	0	171	25	196
	Hastings & Prince Edward Counties	0	76	4	80
	Kingston, Frontenac, Lennox & Addington	0	146	15	161
	Leeds, Grenville And Lanark District	1	93	10	103
	Renfrew County And District	0	37	12	49
	TOTAL EASTERN	7	936	425	1,361
Central East	Durham Region	n/a	146	124	270
	Haliburton, Kawartha, Pine Ridge	1	43	13	56
	Peel Region	11	361	704	1,065
	Peterborough County-City	n/a	44	4	48
	Simcoe Muskoka District	6	132	64	196
	York Region	4	198	494	692
	TOTAL CENTRAL EAST	22	924	1,403	2,327
Toronto	Toronto				
		29	827	1,587	2,414
	TOTAL TORONTO	29	827	1,587	2,414
South West	Chatham-Kent	0	32	6	38
	Elgin-St. Thomas	0	21	0	21
	Grey Bruce	3	35	12	47
	Huron County	2	25	2	27
	Lambton County	0	54	1	55
	Middlesex-London	5	201	28	229
	Oxford County	0	61	3	64
	Perth District	0	33	3	36
	Windsor-Essex County	1	136	49	185
	TOTAL SOUTHWEST	11	598	104	702
Central West	Brant County	0	22	8	30
	City Of Hamilton	3	209	124	333
	Haldimand-Norfolk	0	0	6	6
	Halton Region	1	167	219	386
	Niagara Region	7	228	20	248
	Waterloo Region	2	117	38	155
	Wellington-Dufferin-Guelph	1	44	26	70
	TOTAL CENTRAL WEST	14	787	441	1,228
	Out of Province	0	0	6	6
	TOTAL ONTARIO	87	4,542	4,091	8,633

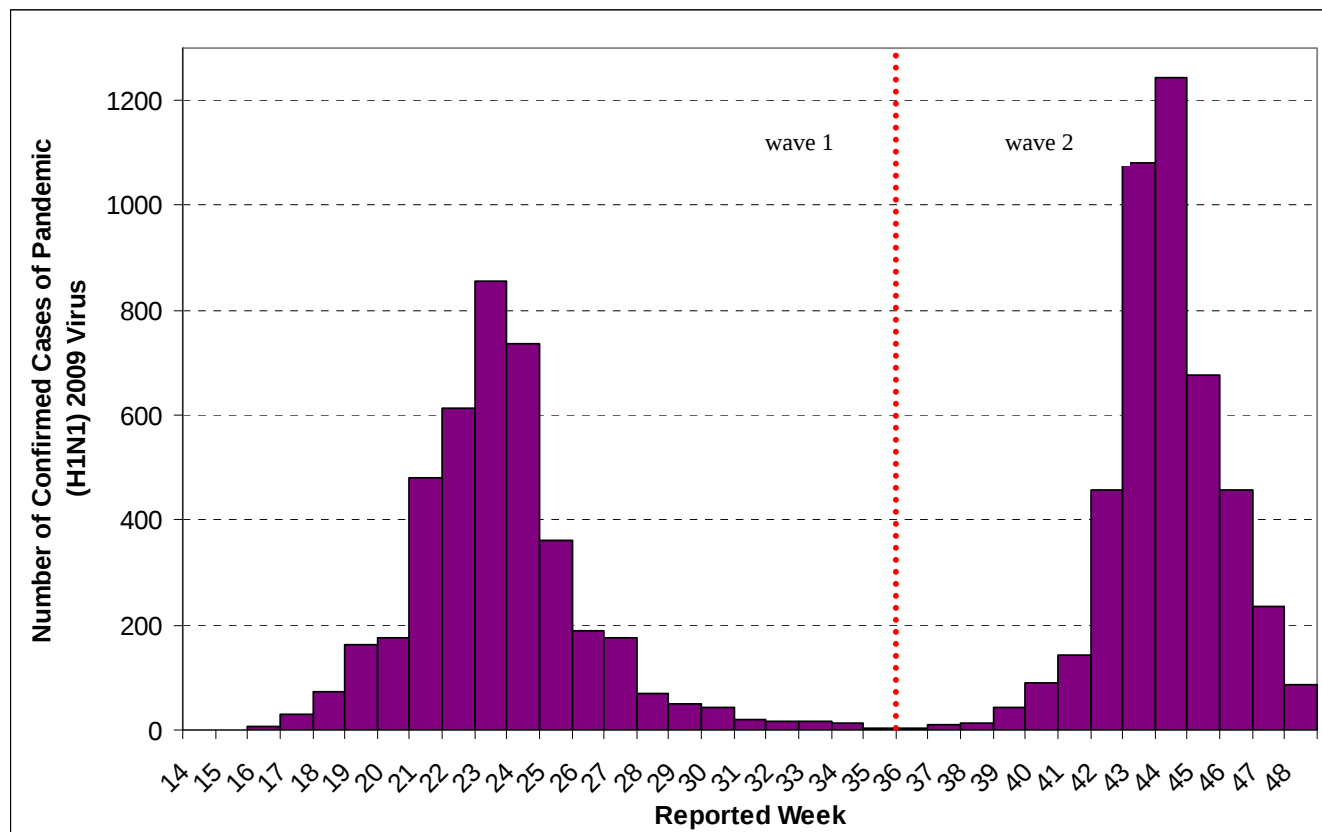
SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [09/12/2009].

[†] Reported date corresponds to the date pandemic (H1N1) 2009 was reported to the health unit

* Cumulative case counts include late reports and records that are otherwise reconciled. Therefore, cumulative counts may not equal new cases plus previous cumulative value.

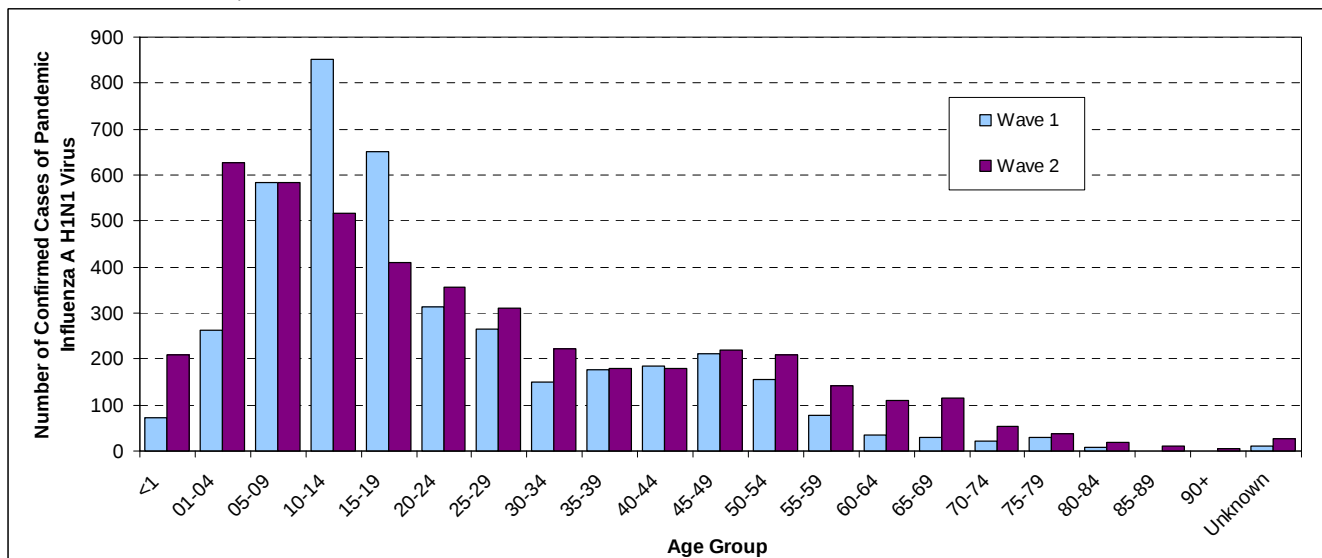
Note: Wave 1 corresponds to April 12, 2009 to August 29, 2009; Wave 2 corresponds to August 30, 2009 to the last date of the current week.

Figure 2: Laboratory confirmed cases of pandemic (H1N1) 2009 in Ontario by week between April 13 and December 5, 2009



SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [09/12/2009].

Figure 3: Laboratory confirmed cases of pandemic (H1N1) 2009 in Ontario by age group and wave between April 13 and December 5, 2009



SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [09/12/2009].

Table 3: Confirmed cases of influenza by health unit & health region, excluding laboratory confirmed pandemic (H1N1) 2009, with an episode date[†] during Week 48, 2009-10

Region	Health Unit	Confirmed Influenza					
		Influenza A (no subtype /not subtyped)	Influenza A (Other)*	Influenza A (seasonal) [‡]	Influenza A & B	Influenza B	TOTAL
North West	Northwestern	0	0	0	0	0	0
	Thunder Bay District	0	0	0	0	0	0
	TOTAL NORTH WEST	0	0	0	0	0	0
North East	Algoma	0	0	0	0	0	0
	North Bay Parry Sound District	0	0	0	0	0	0
	Porcupine	0	0	0	0	0	0
	Sudbury & District	0	0	0	0	0	0
	Timiskaming	0	0	0	0	0	0
	TOTAL NORTH EAST	0	0	0	0	0	0
Eastern	City of Ottawa	0	0	0	0	0	0
	Eastern Ontario	0	0	0	0	0	0
	Hastings & Prince Edward Counties	0	0	0	0	0	0
	Kingston, Frontenac, Lennox & Addington	0	0	0	0	0	0
	Leeds, Grenville And Lanark District	0	0	0	0	0	0
	Renfrew County And District	0	0	0	0	0	0
	TOTAL EASTERN	0	0	0	0	0	0
Central East	Durham Region	0	0	0	0	0	0
	Haliburton, Kawartha, Pine Ridge	0	0	0	0	0	0
	Peel Region	2	0	0	0	0	2
	Peterborough County-City	0	0	0	0	0	0
	Simcoe Muskoka District		0	0	0	0	
	York Region	0	0	0	0	0	0
	TOTAL CENTRAL EAST	2	0	0	0	0	2
Toronto	Toronto	2	0	0	0	0	2
	TOTAL TORONTO	2	0	0	0	0	2
South West	Chatham-Kent	0	0	0	0	0	0
	Elgin-St. Thomas	0	0	0	0	0	0
	Grey Bruce	0	0	0	0	0	0
	Huron County	0	0	0	0	0	0
	Lambton County	0	0	0	0	0	0
	Middlesex-London	0	0	0	0	0	0
	Oxford County	0	0	0	0	0	0
	Perth District	0	0	0	0	0	0
	Windsor-Essex County	0	0	0	0	0	0
	TOTAL SOUTHWEST	0	0	0	0	0	0
Central West	Brant County	0	0	0	0	0	0
	City Of Hamilton	1	0	0	0	0	1
	Haldimand-Norfolk	1	0	0	0	0	1
	Halton Region	0	0	0	0	0	0
	Niagara Region	1	0	0	0	0	1
	Waterloo Region	1	0	0	0	0	1
	Wellington-Dufferin-Guelph	0	0	0	0	0	0
	TOTAL CENTRAL WEST	4	0	0	0	0	4
	TOTAL ONTARIO	8	0	0	0	0	8

SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [09/12/2009].

[†] Episode Date for a case corresponds to the earliest date on record for the case according to the iPHIS hierarchy (Symptom Date > Clinical Diagnosis Date > Specimen Collection Date > Lab Test Date > Reported Date)

[‡]includes seasonal H1/H3

*includes indeterminate, untypeable and other subtypes

Table 4: Cumulative* confirmed cases of influenza by health unit & health region, excluding laboratory confirmed pandemic (H1N1) 2009, with an episode date[†] between September 1, 2009 – December 5, 2009

Region	Health Unit	Confirmed Influenza					
		Influenza A (no subtype /not subtyped)	Influenza A (Other)*	Influenza A (seasonal) [‡]	Influenza A & B	Influenza B	TOTAL Cumulative
North West	Northwestern	1	1	0	0	0	2
	Thunder Bay District	72	2	0	0	0	74
	TOTAL NORTH WEST	73	3	0	0	0	76
North East	Algoma	51	1	0	0	0	52
	North Bay Parry Sound District	59	3	0	0	0	62
	Porcupine	48	4	0	0	0	52
	Sudbury & District	74	2	0	0	0	76
	Timiskaming	9	1	0	0	0	10
	TOTAL NORTH EAST	241	11	0	0	0	252
Eastern	City of Ottawa	8	0	0	0	0	8
	Eastern Ontario	19	0	0	0	0	19
	Hastings & Prince Edward Counties	36	0	0	0	0	36
	Kingston, Frontenac, Lennox & Addington	35	0	0	0	0	35
	Leeds, Grenville And Lanark District	19	0	0	0	0	19
	Renfrew County And District	14	0	0	0	0	14
	TOTAL EASTERN	131	0	0	0	0	131
Central East	Durham Region	91	5	0	0	0	96
	Haliburton, Kawartha, Pine Ridge	37	2	0	0	0	39
	Peel Region	277	7	0	0	2	286
	Peterborough County-City	34	3	0	0	0	37
	Simcoe Muskoka District	150	4	0	0	0	154
	York Region	166	0	0	0	0	166
	TOTAL CENTRAL EAST	755	21	0	0	2	778
Toronto	Toronto	373	12	0	0	1	386
	TOTAL TORONTO	373	12	0	0	1	386
South West	Chatham-Kent	30	0	0	0	0	30
	Elgin-St. Thomas	24	0	0	0	0	24
	Grey Bruce	85	0	0	0	0	85
	Huron County	29	0	0	0	0	29
	Lambton County	23	0	0	0	0	23
	Middlesex-London	131	2	1	0	0	134
	Oxford County	24	5	0	0	0	29
	Perth District	17	0	0	0	2	19
	Windsor-Essex County	238	0	0	0	0	238
	TOTAL SOUTHWEST	601	7	1	0	2	611
Central West	Brant County	29	0	0	0	0	29
	City Of Hamilton	213	0	0	0	1	214
	Haldimand-Norfolk	26	0	0	0	0	26
	Halton Region	129	2	0	0	0	131
	Niagara Region	118	7	0	0	1	126
	Waterloo Region	123	0	1	0	0	124
	TOTAL CENTRAL WEST	692	9	1	0	3	705
	TOTAL ONTARIO	2866	63	2	0	8	2939

SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [09/12/2009].

Cumulative case counts include late reports and records that are otherwise reconciled. Therefore, cumulative counts may not equal new cases plus previous cumulative value.

[†] Episode Date for a case corresponds to the earliest date on record for the case according to the iPHIS hierarchy (Symptom Date > Clinical Diagnosis Date > Specimen Collection Date > Lab Test Date > Reported Date)

[‡]includes seasonal H1/H3

*includes indeterminate, untypeable and other subtypes

Deaths among pandemic (H1N1) 2009 virus cases, April 13 – December 9, 2009

A total of 113 deaths have been reported since April, with 22% (25) reported in wave 1 and 78% (88) in wave 2. Of the reported deaths, 77% (87) were hospitalized prior to death. Overall, cases that died ranged in age from 0 to 95 years and had a mean and median age of 53 and 55 years, respectively. Women accounted for slightly less than half of all cases that have died, with 43% of deaths occurring among women.

Mortality due to pH1N1 increased with increasing age; people in the 45-64 and in the 65 and older age groups accounted for the highest mortality rates. These rates were higher than the overall provincial rate. A similar trend was observed for both waves one and two.

The mean and median days from symptom onset to death were 20.6 and 14 days, respectively, in Wave 1. The mean and median days from symptom onset to death were 10.7 and 9 days, respectively, in Wave 2. The statistics for Wave 2 must be interpreted with caution as they will continue to change as more information becomes available. Among the 113 confirmed cases that have died, 94 (83%) had underlying chronic medical conditions reported, compared to 92% (23) of wave 1 cases and 84% (74) of wave 2 cases. Reporting of underlying chronic medical conditions may be incomplete for wave 2 cases due to delays in data entry.

Hospitalizations among pandemic (H1N1) 2009 virus cases, April 13 – December 9, 2009

A total of 1,725 hospitalizations have been reported, with 22% (385) reported in wave 1 and 78% (1,340) reported in wave 2. The cumulative hospitalization rate of pH1N1 related hospitalizations is 13.4 hospitalizations per 100,000 population. In general, the hospitalization rate of pH1N1 cases decreased with increasing age, with persons in the three youngest age ranges (under 15 years) accounting for the highest hospitalization rates. Persons aged 15 years and older had lower hospitalization rates which were all below the overall provincial hospitalization rate for pH1N1. A similar trend was observed for wave one and wave two cases. Hospitalized cases under the age of 20 years account for 48% of hospitalized cases in wave 1 and 44% of hospitalized cases in wave 2.

Admission to ICU and/or use of a ventilator was reported for 21% (80) of wave one cases and 18% (242) of wave 2 cases; Overall, 19% (322) of hospitalizations have been admitted to ICU and/or placed on a ventilator. Fever, cough, shortness of breath, vomiting, malaise, myalgia and sore throat/difficulty swallowing have been the most commonly reported symptoms among hospitalized cases. The mean and median days from symptom onset to hospitalization were 2.7 and 2 days, respectively, in Wave 1. The mean and median days from symptom onset to hospitalization were 2.0 and 2 days, respectively, in Wave 2.

Table 5. Overview of key surveillance indicators among fatal and hospitalized cases in Ontario*

Surveillance Indicators	Wave 2 (Sep 1 – Dec 9, 2009)	Wave 1 (Apr - Aug 31, 2009)	Total (Apr - Dec 9, 2009)
Number of deaths	88 (78%)	25 (22%)	113 (100%)
Number of hospitalizations	1340 (78%)	385 (22%)	1,725 (100%)
Hospitalization status			
Discharged	87% (1165)	98% (378)	87% (1,543)
Currently hospitalized	13% (175)	2% (7)	11% (182)
Length of hospital stay (days)**			
Mean	4	7	4
Median	3	4	3
Range	0-106	0-127	0-127

Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [09/12/2009]

Note: Cases that were hospitalized or that have died are not mutually exclusive.

* 26 fatal cases were not hospitalized before death;

**Mean and Median LOS excludes those outside of the 95th percentile.

Table 6. Hospitalizations among confirmed cases of pandemic (H1N1) 2009 in Ontario, April 13 – December 9, 2009

Hospitalization Status	Ventilator and/or ICU	Not in ICU and not on ventilator	Number of cases hospitalized to date
Number Currently Hospitalized	67 (37%)	115 (63%)	182 (100%)
Number Hospitalized and Discharged	255 (17%)	1288 (83%)	1543 (100%)
Total Hospitalized to date	322 (19%)	1403 (81%)	1725 (100%)

Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [09/12/2009]

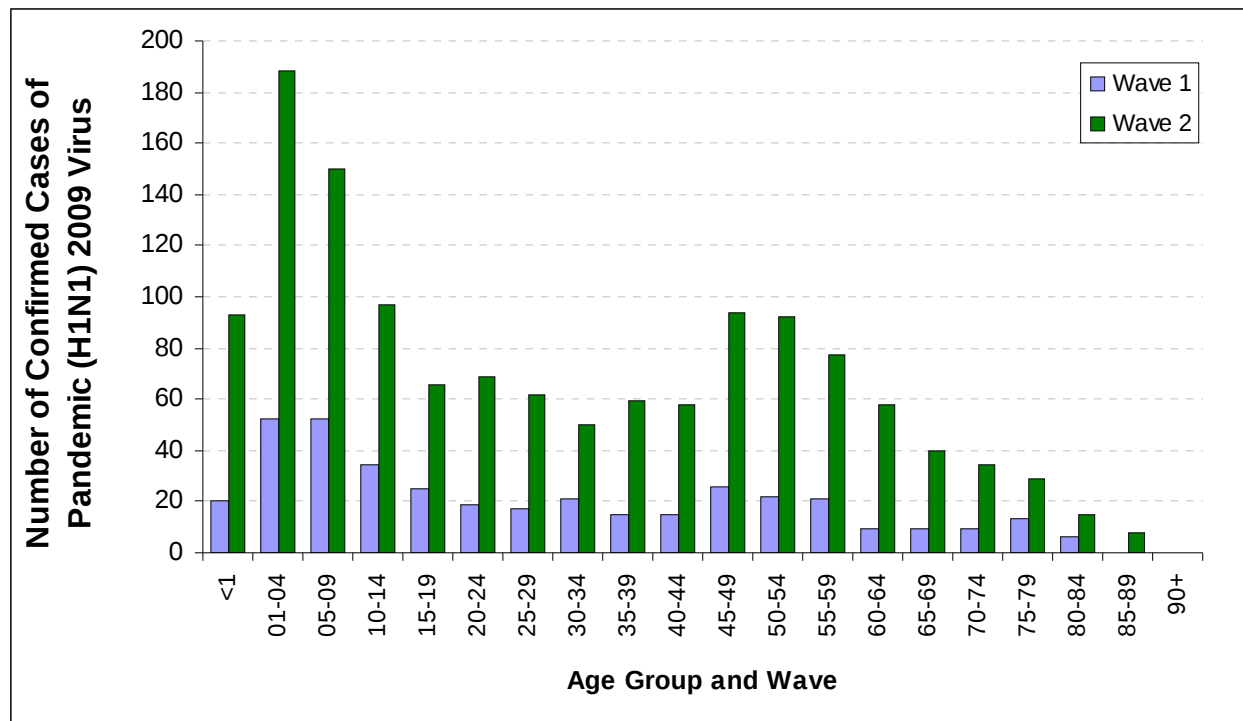
Table 7. Incidence of hospitalization and death due to pandemic H1N1 2009 in Ontario, April 13 – December 9, 2009

Age Group	Hospitalizations	Rate/100,000	Deaths	Rate/100,000
<1	113	84.33	1	0.75
1-4	240	43.94	0	0.00
5-14	333	21.57	5	0.32
15-24	179	10.23	9	0.51
25-44	297	7.93	18	0.48
45-64	399	11.49	49	1.41
65+	163	9.43	31	1.79
TOTAL	1724	13.34	113	0.87

Source (incidence): Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [09/12/2009]

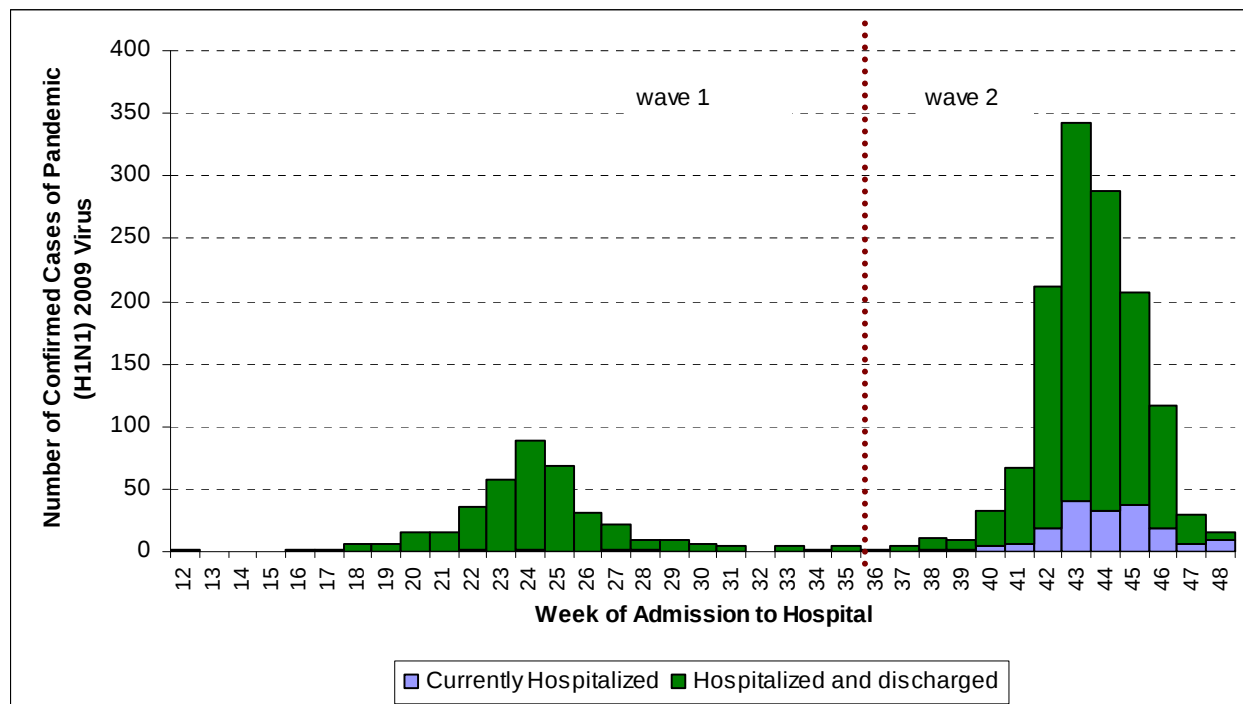
Source (incidence): Ontario population projections for 2008: Ontario Ministry of Health and Long-Term Care, Public Health Planning Database (PHPDB), extracted [12/02/2009]

Figure 4: Hospitalized cases in Ontario by age group and wave, April 13 to December 9, 2009



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [09/12/2009]

Figure 5: Hospitalized cases of pandemic (H1N1) 2009 by hospital admission week in Ontario, April 13 – December 9, 2009*



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [09/12/2009]

Note: Interpret tail with caution due to reporting lags, changes in lab testing, case identification and data entry.

Ontario Influenza Bulletin, 2009-2010
Surveillance Week 48 (November 29, 2009 – December 5, 2009)
Influenza Subtype(s):

During week 48, a total of 5917 results of isolate testing were received by the Public Health Agency of Canada, with 740 testing positive for influenza A and none positive for influenza B. 308 of the reported influenza A isolates were from Quebec (41.6%), 114 were from Manitoba (15.4%), 93 were from Ontario (12.6%), and 73 were from Saskatchewan (9.9%). Quebec also reported 1 seasonal H3 isolate for week 48*

(Antigenic Characterization and Antiviral Resistance data are current as of December 10, 2009)

Antigenic Characterization (National):

Since September 1, 2009, National Microbiology Laboratory (NML) has antigenically characterized 433 pandemic H1N1 viruses and eight seasonal influenza viruses (two A/H1N1, five H3N2 and one B virus) that were received from Canadian laboratories.

Pandemic Influenza A (H1N1):

Among the 433 pandemic influenza A (H1N1) viruses characterized, 430 (99.3%) were antigenically related to A/California/7/2009, which is the pandemic reference virus selected by WHO as a potential candidate for 2009 influenza A (H1N1) vaccine. Three viruses (0.7%) tested showed reduced titer with antisera produced against A/California/7/2009. Sequence analysis showed that the two viruses with reduced titer did not have the mutation at amino acid position 222 as reported by Norway.

Seasonal Influenza A (H1N1):

Two seasonal influenza A/H1N1 viruses characterized were related to A/Brisbane/59/2007, which is the influenza A/H1N1 component for the 2009-2010 influenza vaccine.

Seasonal Influenza A (H3N2):

Of the five H3N2 viruses, one seasonal influenza A (H3N2) virus characterized was related to A/Brisbane/10/2007, which is the influenza A/H3N2 component recommended for the 2009-10 influenza vaccine. Four viruses were antigenically related to A/Perth/16/2009, which is the WHO recommended influenza A (H3N2) component for the 2010 Southern Hemisphere vaccine formulation.

Influenza B:

The one influenza B virus characterized was antigenically related to B/Brisbane/60/2008, which is the recommended influenza B component for the 2009-2010 influenza vaccine.

Antigenic Characterization (Provincial):

The National Microbiology Laboratory (NML) has antigenically characterized the following strains from Ontario: 208 influenza A/California/07/2009-like and 1 influenza B/Brisbane/60/2008-like.

Antiviral Resistance and Sensitivity (National):

a) Amantadine:

Twelve seasonal influenza A viruses (two H1N1 and 10 H3N2) and 441 pandemic H1N1 viruses were tested for resistance to amantadine and found that one H1N1 virus, all 10 H3N2 viruses and all 441 pandemic H1N1 viruses were resistant. One seasonal H1N1 virus was sensitive to amantadine.

b) Oseltamivir:

Five seasonal influenza viruses (two H1N1, two H3N2 and one B) and 453 pandemic H1N1 viruses were tested for resistance to oseltamivir. Two seasonal H1N1 isolates were resistant to oseltamivir. Of the 453 pandemic H1N1 viruses tested, 448 were sensitive to oseltamivir and five pH1N1 isolates were resistant to oseltamivir with the H275Y mutation. The resistance was associated with oseltamivir treatment. The two H3N2 viruses and one B virus were sensitive to oseltamivir.

c) Zanamivir:

Five seasonal influenza viruses (two H1N1, two H3N2 and one B) and 440 pandemic H1N1 viruses were tested for resistance to zanamivir. All five seasonal influenza viruses and all 440 pandemic H1N1 viruses were sensitive to zanamivir.

Antiviral Resistance and Sensitivity (Provincial):

a) Amantadine:

Of the 208 isolates tested, none were sensitive to amantadine. The two H3N2 isolates were resistant to amantadine.[†]

b) Oseltamivir

Of the 220 influenza pH1N1 isolates tested, 216 were sensitive to oseltamivir.

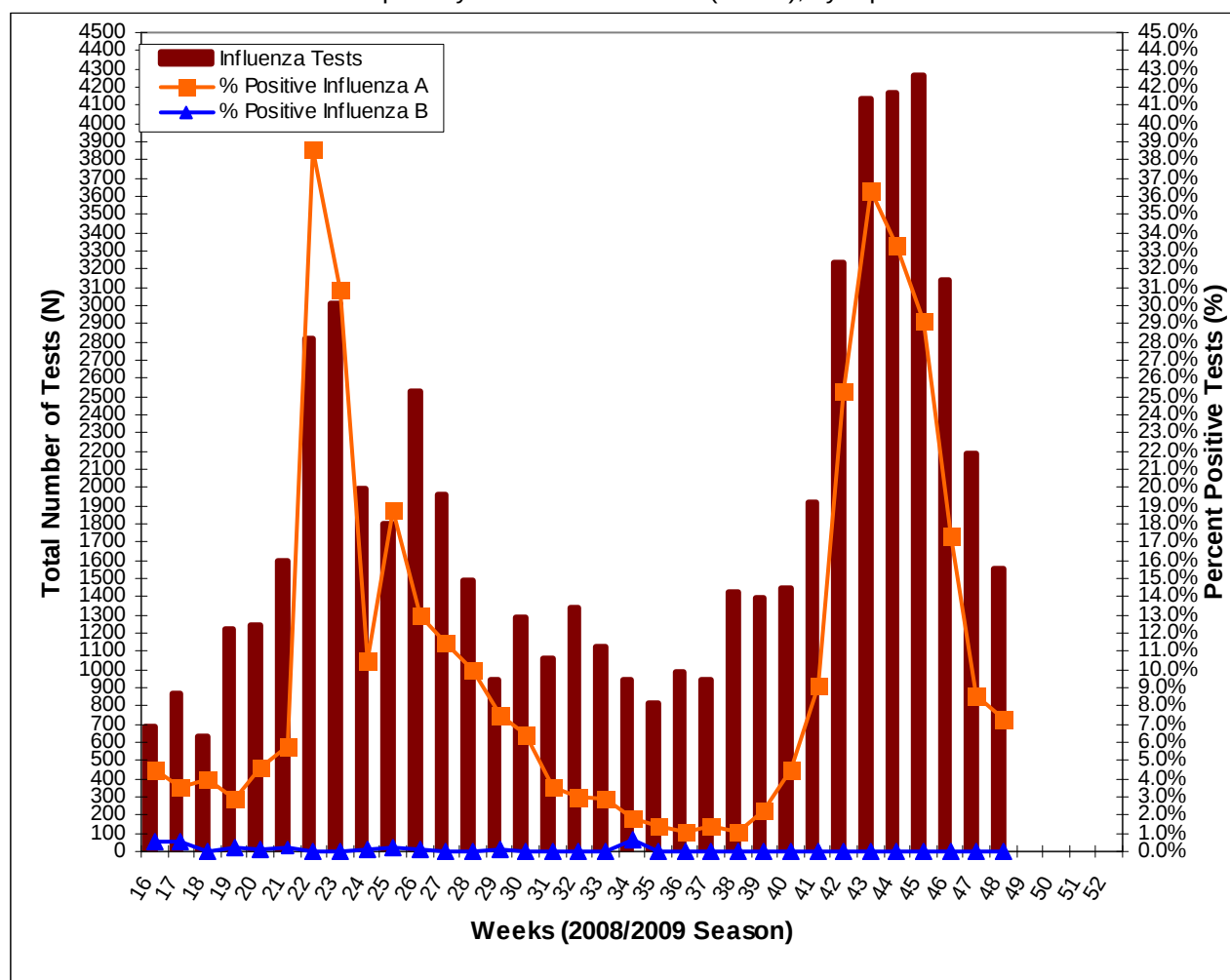
c) Zanamivir

, All 214 isolates tested were sensitive to zanamivir.

The influenza B isolate was sensitive to oseltamivir and zanamivir.

* These data have been obtained from the Respiratory Virus Detection tables of Public Health Agency of Canada and do not include data from late reports to PHAC: Week 48, 2009. Please note that the last version received from PHAC as of 4:00PM on December 10, 2009 was used.

[†] These data have been obtained from the National Microbiology Laboratory of the Public Health Agency of Canada for Week 48, 2009.

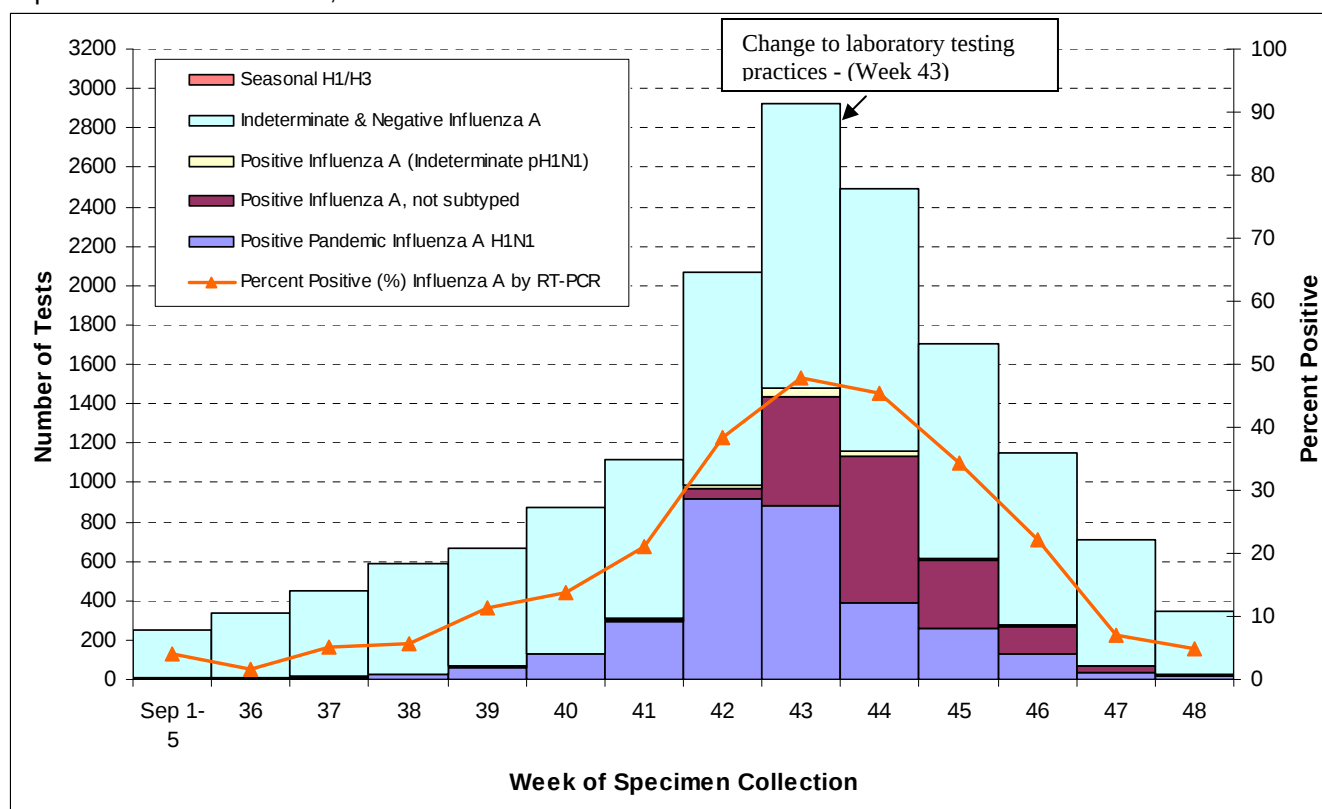
Figure 6: Total number of influenza tests performed and percent of positive tests in Ontario reported to the Centre for Immunization and Respiratory Infectious Diseases (CIRID), by report week*.

Source: Public Health Agency of Canada. These data have been obtained from the Respiratory Virus Detection tables of Public Health Agency of Canada from 17 labs in Ontario and do not include data from late reports to PHAC for the current season: Week 48, 2009. Please note that the last version received from PHAC as of 4:00PM on December 9, 2009 was used.

* Total numbers reported include late reports from previous seasons; therefore totals may not be equal to the sum of the weekly numbers.

Note: Cumulative numbers for season to date are available through FluWatch: <http://www.phac-aspc.gc.ca/fluwatch/>

Figure 6a: Total number of influenza tests performed and percent of positive tests in Ontario conducted by the Ontario Agency for Health Protection and Promotion Laboratory – Toronto, by specimen collection week September 1 – December 5, 2009



Source: Adapted from Table 1 in the "OAHPP Laboratory Pandemic H1N1 Surveillance Report"; Monday, December 7, 2009

Note: Not all cases with specimens collected during week 48 are included in this summary due to the lag in time from the date of specimen collection to the date the final test result is confirmed.

Note: Beginning on Week 43, subtyping will be only performed on 20% of influenza A positive tests, in addition to all intensive care patients and outbreak samples.

Table 8: Summary of Other Respiratory Virus Detections/Isolations in Ontario in Week 48

Organism Name	Number of Positive Tests	Number of Tests	% Positive
Respiratory Syncytial Virus	25	836	2.99
Parainfluenza (all types)	33	818	4.03
Adenovirus	3	818	0.37
Human Metapneumovirus	0	241	0.00

SOURCE: These data have been obtained from the Respiratory Virus Detection tables of Public Health Agency of Canada from 17 labs in Ontario and do not include data from late reports to PHAC: Week 48, 2009. Please note that the last version received from PHAC as of 4:00PM on December 10, 2009 was used.

Table 9: Institutional respiratory infection outbreaks in Ontario: new outbreaks* in Week 48 and total outbreaks for the season**

Institutional Respiratory Infection Outbreaks		
New Outbreaks*	N	% (of outbreaks)
Influenza A (All subtypes)	0	0.0
Influenza B	0	0.0
Influenza A and B	0	0.0
Parainfluenza (All types)	0	0.0
RSV	0	0.0
Other organisms	0	0.0
No organism identified	1	100.0
TOTAL	1	100.0
Total Respiratory Infection Outbreaks of the Season to date**	N	% (of outbreaks)
Influenza A	55	27.1
Influenza B	0	0.0
Influenza A and B	0	0.0
Parainfluenza (All types)	2	1.0
RSV	2	1.0
Combined Outbreaks [†]	19	9.4
Other organisms	58	28.6
No organism identified	67	33.0
TOTAL	203	100.0
Types of Institutions – All Outbreaks **	N	% (of outbreaks)
Long-Term Care Homes	116	57.1
Hospitals	18	8.9
Retirement Homes	13	6.4
Other	10	4.9
Unknown	46	22.7
TOTAL	203	100.0
	N	% (of outbreaks)
New Outbreaks – Pandemic (H1N1) 2009*	0	0.0
Total pH1N1 2009 Infection Outbreaks of the Season to date**	44	100.0
	N	% (of outbreaks)
Types of Institutions (pH1N1 Outbreaks)		
Long-Term Care Homes	8	18.2
Hospitals	14	31.8
Retirement Homes	3	6.8
Other	4	9.1
Unknown	15	34.1
TOTAL	44	100.0

SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [09/12/2009]

* New outbreaks are those in which the date of onset of illness in the first case occurred and recorded through iPHIS in the current surveillance period; i.e. November 29, 2009 – December 5, 2009

** Season to date includes all outbreaks in which the date of onset of illness in the first case occurred up to Week 45. For pH1N1 note that there have been 4 outbreaks between April 13, 2009 and August 31, 2009 - 2 in LTCHs and 2 in Hospitals.

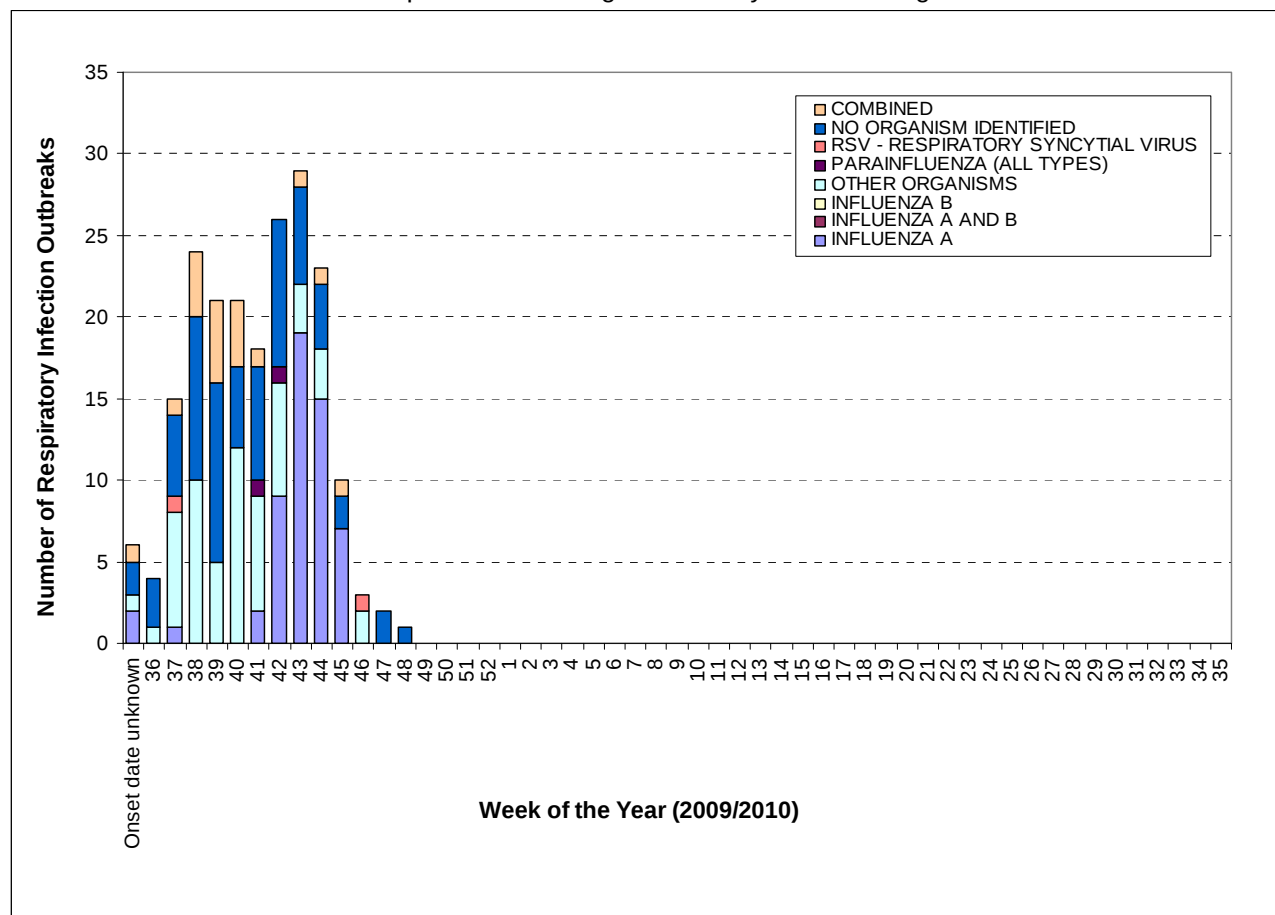
[†] Combined outbreaks include outbreaks in which more than one non-influenza organism has been identified (e.g. RSV, parainfluenza, rhinovirus, etc.)

Table 10: Outbreak Related Complications in institutional respiratory infection outbreaks in Ontario during the Surveillance Season*

Outbreak Related Cases – All Outbreaks	N	% (of total cases)
Residents	1947	65.0
Patients	146	4.9
Staff	903	30.1
Total Cases	2996	100.0
Deaths		% (of cases per role)
Residents	58	3.0
Patients	2	1.4
Staff	0	0.0
Pneumonia (Chest x-ray confirmed)		% (of cases per role)
Residents	49	2.5
Patients	8	5.5
Staff	0	0.0
Hospitalizations		% (of cases per role)
Residents	82	4.2
Staff	0	0.0
Outbreak Related Cases – All Influenza Outbreaks	N	% (of total cases)
Residents	264	54.8
Patients	68	14.1
Staff	150	31.1
Total Cases	482	100.0
Deaths		% (of cases per role)
Residents	18	6.8
Patients	1	0.4
Staff	0	0.0
Pneumonia (Chest x-ray confirmed)		% (of cases per role)
Residents	2	0.8
Patients	4	1.5
Staff	0	0.0
Hospitalizations		% (of cases per role)
Residents	19	7.2
Staff	0	0.0
Outbreak Related Cases – Pandemic (H1N1) 2009 Outbreaks	N	% (of total cases)
Residents	174	47.5
Patients	58	15.8
Staff	134	36.6
Total Cases	366	100.0
Deaths		% (of cases per role)
Residents	18	10.3
Patients	1	1.7
Staff	0	0.0
Pneumonia (Chest x-ray confirmed)		% (of cases per role)
Residents	1	0.6
Patients	4	6.9
Staff	0	0.0
Hospitalizations		% (of cases per role)
Residents	17	9.8
Staff	0	0.0

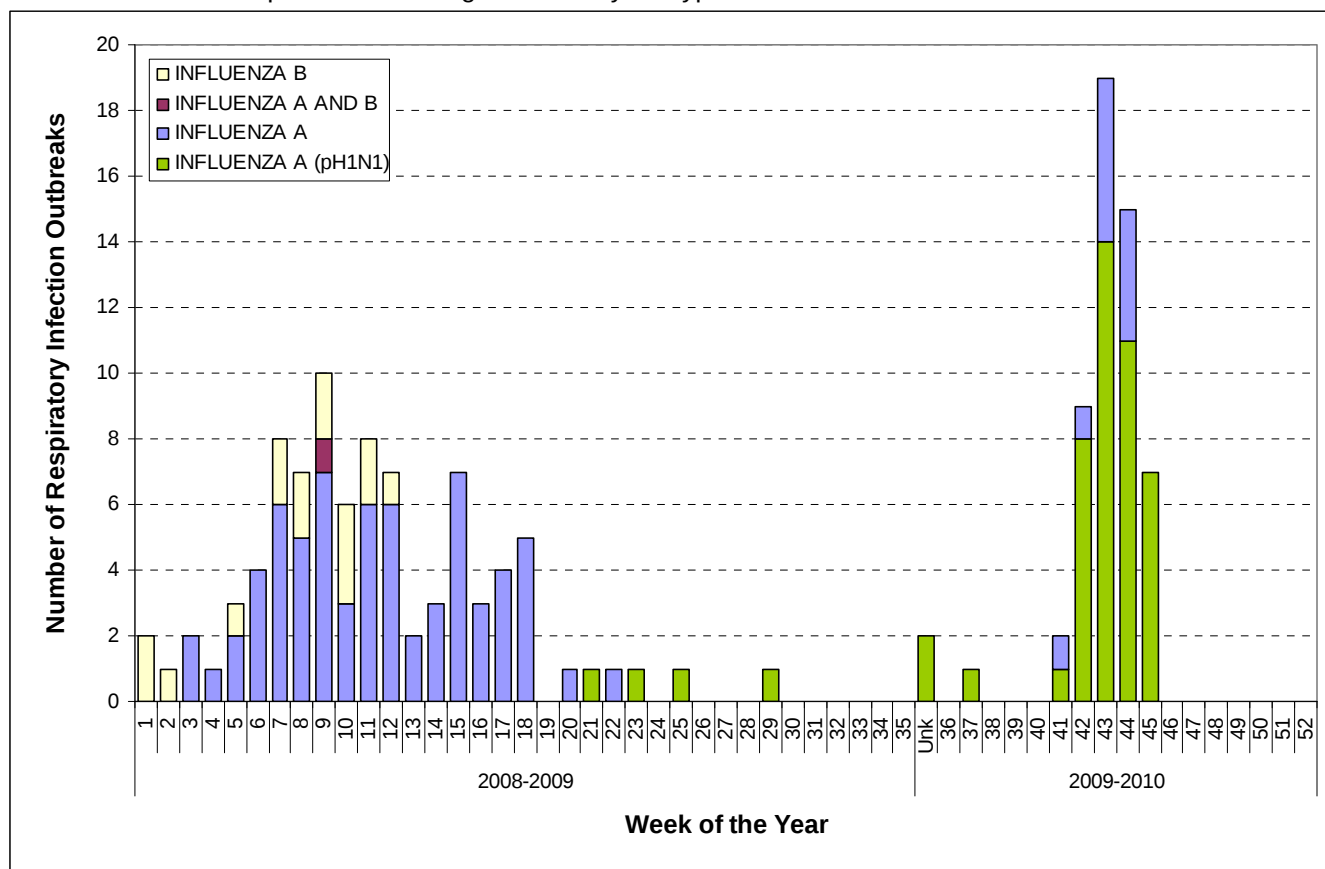
SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [09/12/2009]

Figure 8: Institutional respiratory infection outbreaks in Ontario by onset of illness in the first case: Total Outbreaks up to and including Week 48 by causative organism



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [09/12/2009]

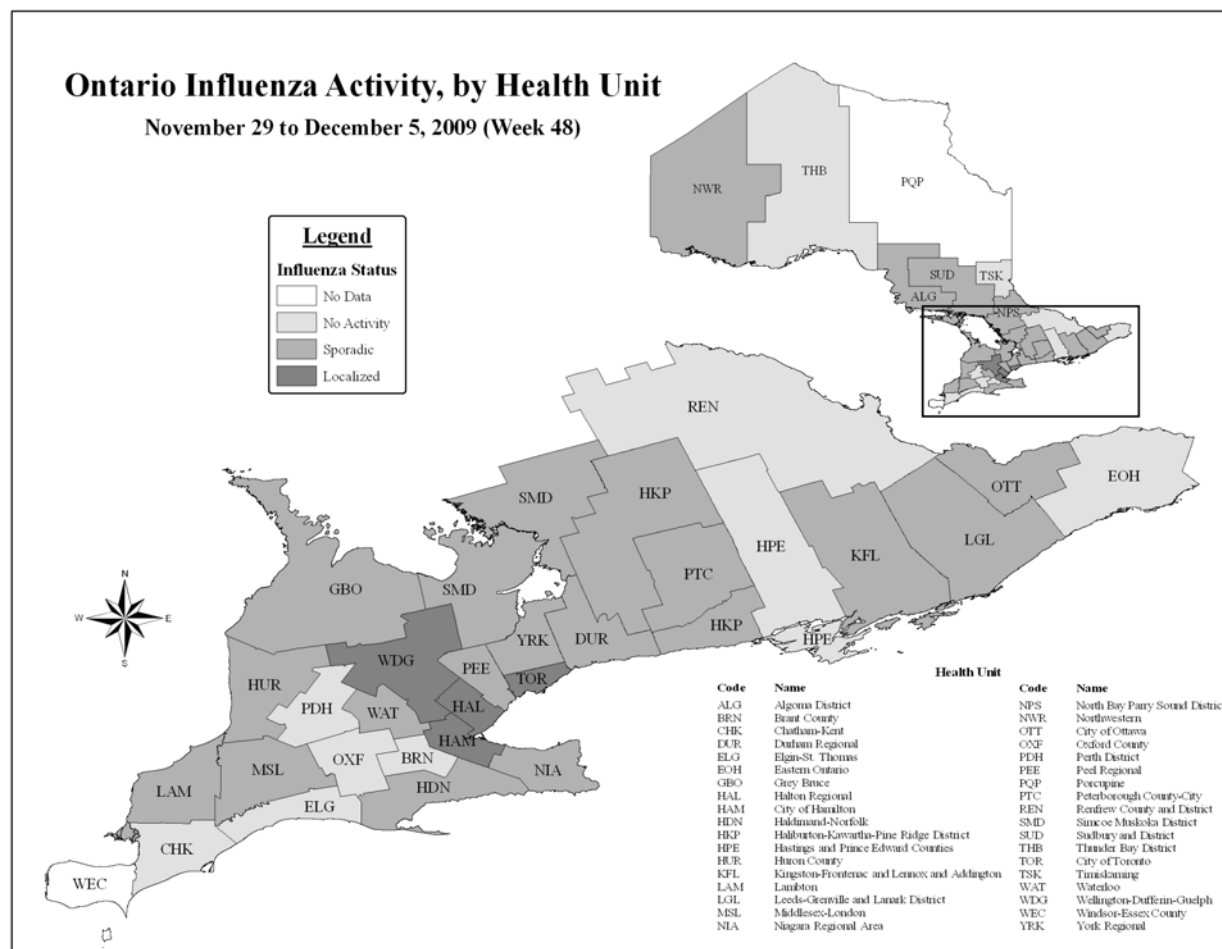
Figure 9: Institutional influenza outbreaks in Ontario by onset of illness in the first case: Total Outbreaks up to and including Week 48 by subtype*



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [09/12/2009]

*School outbreaks are not included in this chart.

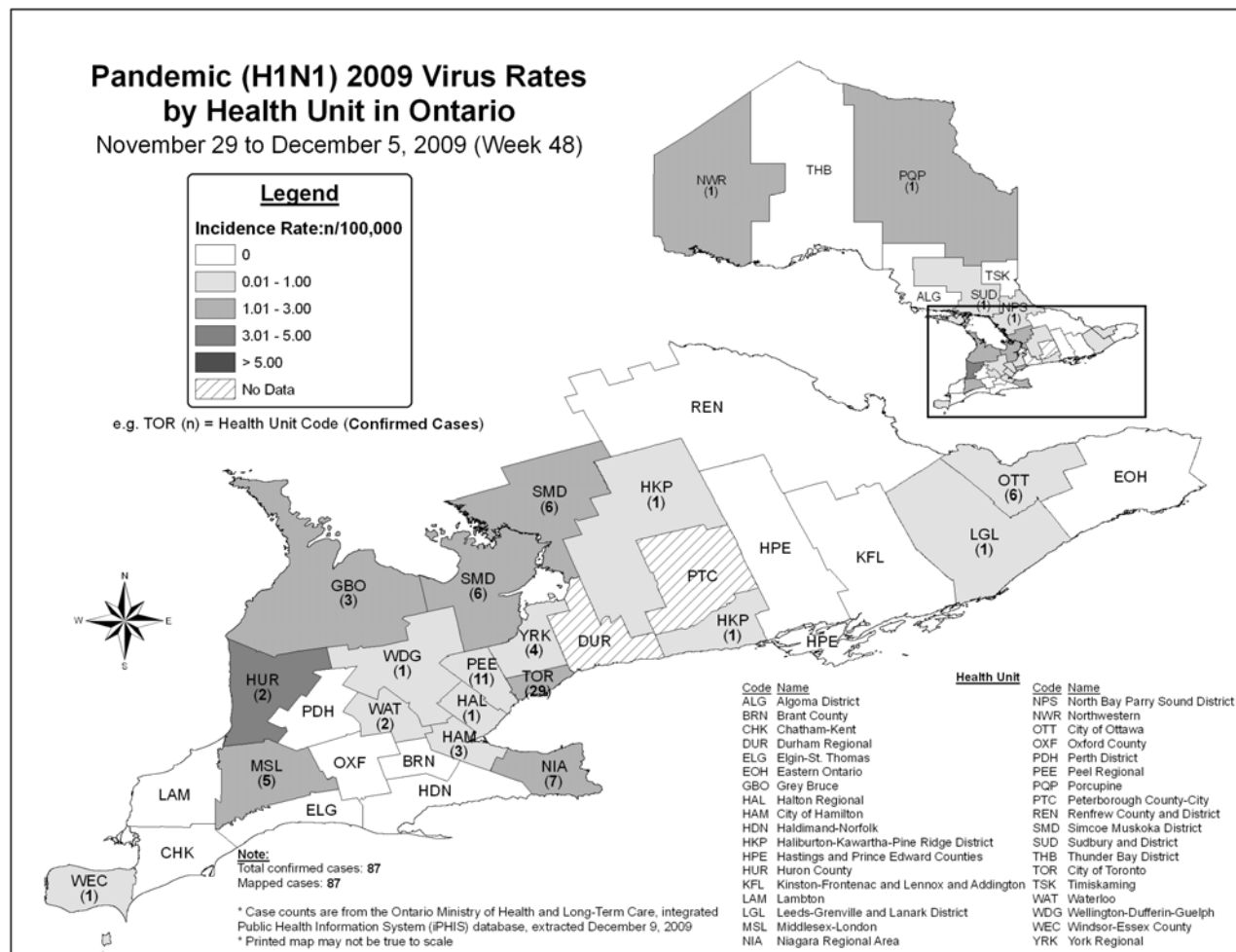
Figure 10: Influenza Activity* levels in Ontario by health unit for Week 48, 2009



SOURCE: MOHLTC [Provincial Influenza Activity Report (Appendix C) Database]

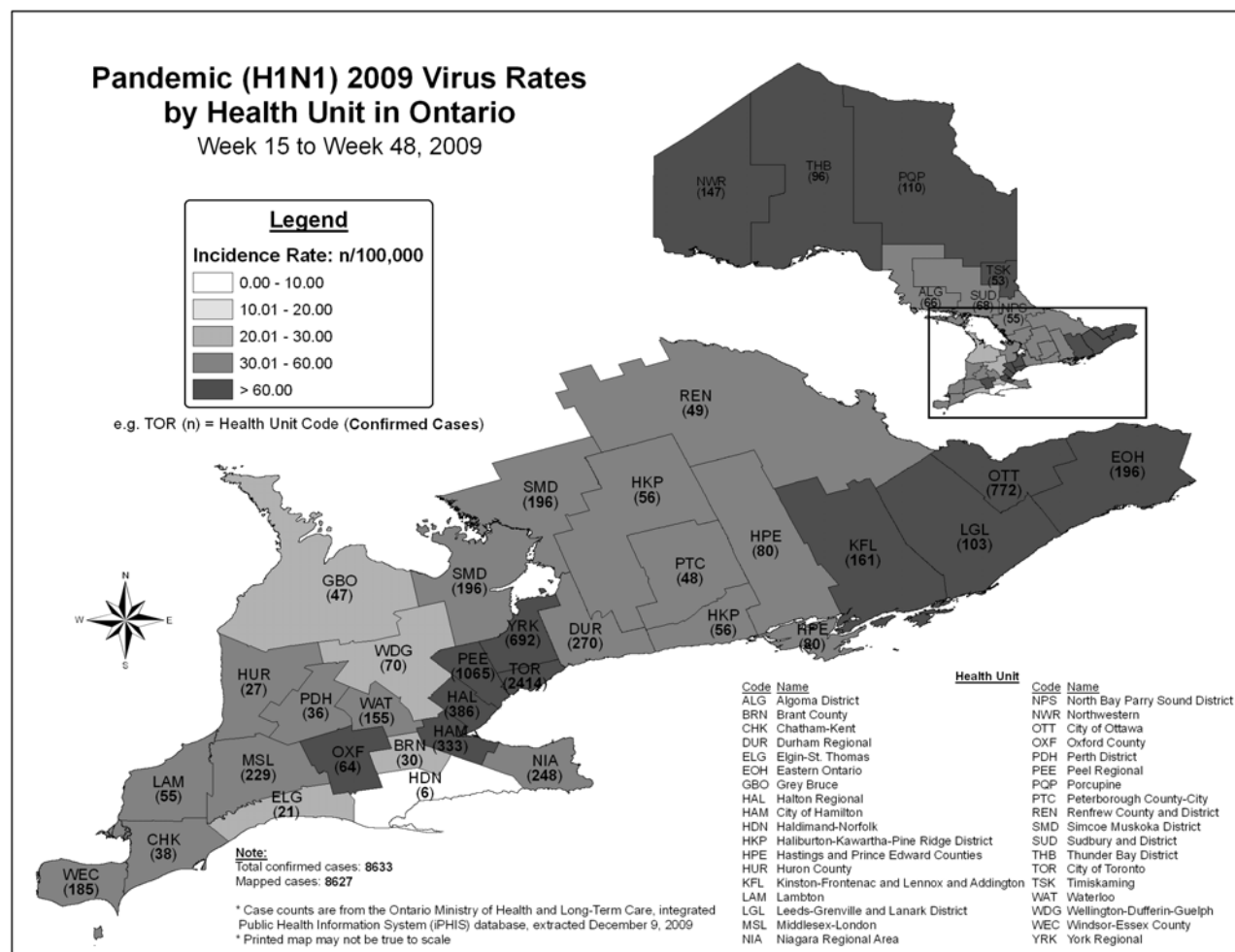
* Influenza activity levels are assigned by local public health units and reported to the MOHLTC by the Tuesday following the end of the surveillance week at 4 pm. Activity levels are assigned based on laboratory confirmations, ILI reports from various sources, and laboratory confirmed institutional outbreaks. Please refer to detailed definitions for the 2009-2010 season included in the Appendix-1]

Figure 11: Pandemic (H1N1) 2009 Virus incidence rates and counts in Ontario by health unit for Week 48, 2009



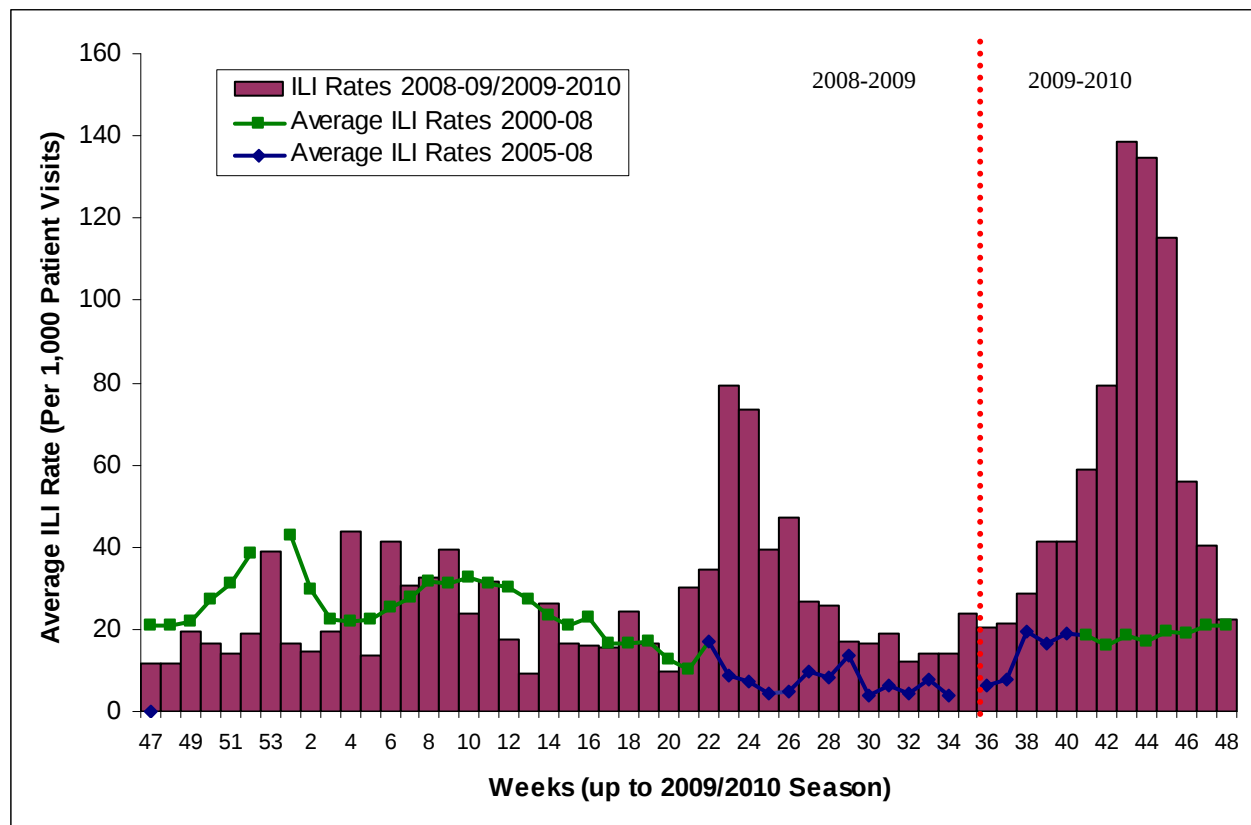
Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [09/12/2009]

Figure 12: Pandemic (H1N1) 2009 Virus cumulative incidence rates and counts in Ontario by health unit, Week 15 – 48 (April 12 – December 5, 2009)



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (IPHIS) database, extracted [09/12/2009]

Figure 13: Average influenza-like illness (ILI) consultation rate (per 1,000 patient visits) reported by sentinel physicians* in Ontario up to the 2009-10 surveillance season, by report week, compared to Ontario average† (1999/2000 to 2007/08 seasons).



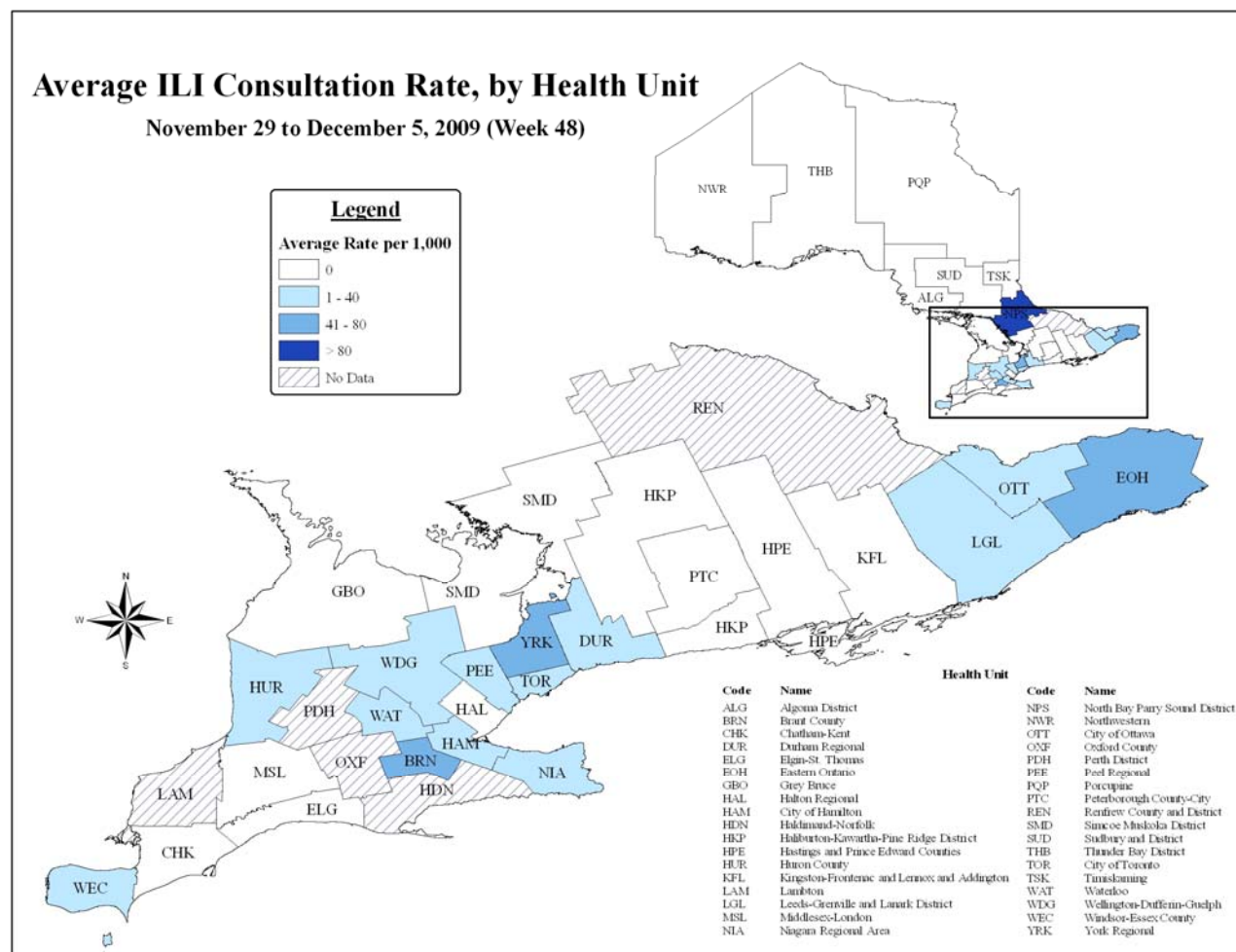
Source: Public Health Agency of Canada

* Sentinel physician information is reported to Public Health Agency of Canada, 100 sentinels reported this week.

† No data available for mean rate in previous years for weeks 21 to 39 (1999-2000 through 2004-2005 seasons). During weeks 20-39, 2002-2003/2004-2005 seasons, ILI is reported once every two weeks, on even weeks only.

Since Week 23, 2009, the number of sentinel physicians has increased, which might affect ILI rate starting from week 23.

Figure 14: Average influenza-like illness consultation rate (per 1,000 patient visits) by health unit as reported by sentinel physicians* in Ontario, for Week 48.



Source: Public Health Agency of Canada

* Sentinel physicians report ILI and patient data to the Public Health Agency of Canada; 100 sentinels reported this week of which all were matched to a health unit and represented in the above map.

Note: The small numbers of sentinel physicians reporting at the local level can make the ILI rates unstable. Please interpret these data correspondingly.

Table 11: Average influenza-like illness consultation rate (per 1,000 patient visits) by age group as reported by sentinel physicians* in Ontario, for Week 48.

Age Category	0 – 4	5 – 19	20 – 64	65 +	Unknown	TOTAL
ILI Sum	8	9	39	4	0	60
ILI Consultation Rate (per 1,000 patient visits)	42.33	30.10	25.02	6.18	0.00	22.27

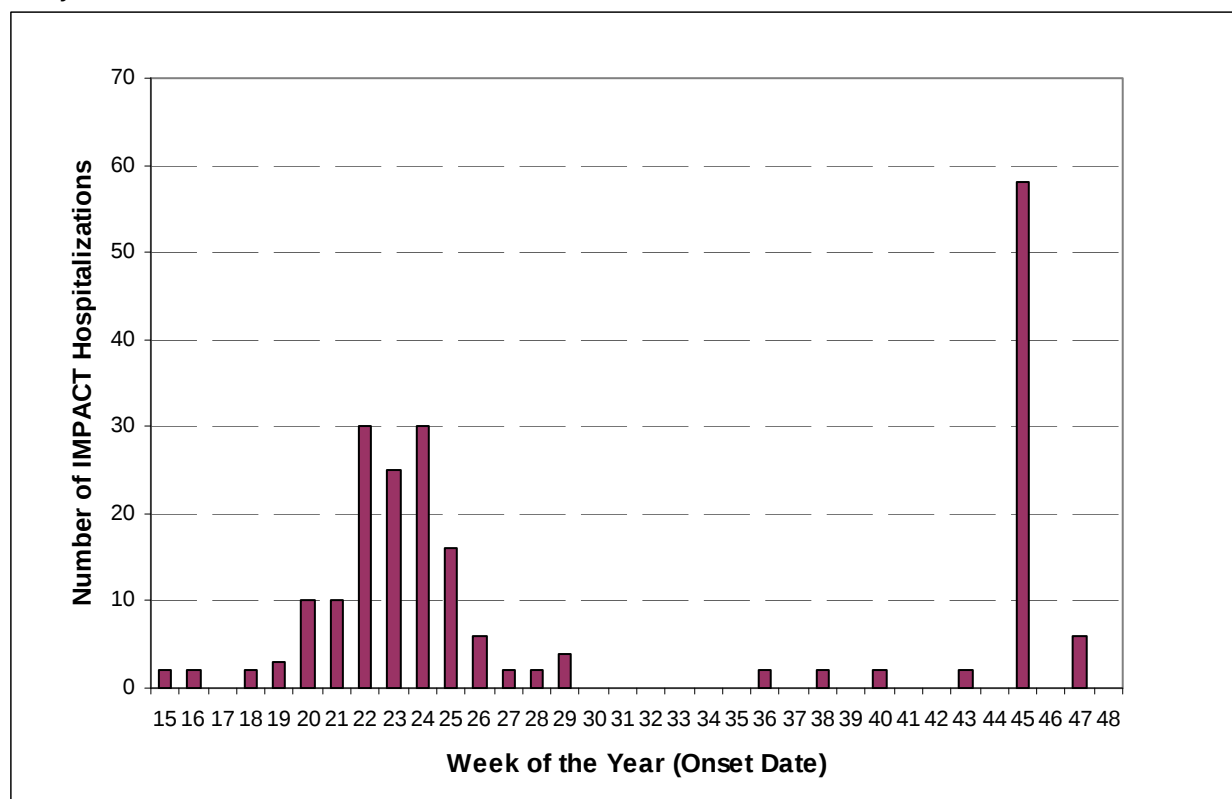
Source: Public Health Agency of Canada

* Sentinel physician information is reported to the Public Health Agency of Canada; 100 sentinels reported this week.

Immunization Monitoring Program ACTive (IMPACT) is a paediatric hospital-based national active surveillance network for adverse events following immunization and selected infectious diseases in children, including influenza-associated pediatric hospitalizations and complements the [Canadian Adverse Event Following Immunization Surveillance System](#) (CAEFISS). It involves 12 Canadian centres, two of which are in Ontario (Children's Hospital of Eastern Ontario in Ottawa and the Hospital for Sick Children, Toronto).

Reports of adverse events following immunization are reported to the Vaccine Safety Unit at the Immunization Division of the Public Health Agency of Canada. Note that the number of IMPACT hospitalizations presented in this week's bulletin has been updated with the latest data received from PHAC.

Figure 15: Number of influenza related hospitalizations in Ontario reported through IMPACT up to Week 48, by onset date.



Source: Public Health Agency of Canada

***Note:** The number of IMPACT hospitalizations presented reflect the latest data received at the time of publication, thus lower numbers of cases reported in recent weeks may be attributed in part to reporting delays.

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Table 12: Number of RT-PCR & Multiplex test results by health unit and agent in Ontario by the Ontario Agency for Health Protection and Promotion Laboratory, for the period November 30, 2009 to December 4, 2009

Health Unit	Results	Total Specimens Testing Positive
OTTAWA	FLU A/pH1N1-PARAINFLUENZA 3	1
	RHINOVIRUS	1
	CORONA 229E/NL63	1
WATERLOO	RHINOVIRUS	1
WINDSOR	PARAINFLUENZA 1	1

Source: Ontario Agency for Health Protection and Promotion, December 10, 2009

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FURTHER INFORMATION

1. Ontario Ministry of Health and Long-Term Care
Previous issues of the *Ontario Influenza Bulletin* can be accessed at:
http://www.health.gov.on.ca/english/providers/program/pubhealth/flu/flu_08/flubul_mn.html
2. Ontario Agency for Health Protection and Promotion
OAHPP Weekly Laboratory Surveillance Update
<http://www.oahpp.ca/SRI%20Bulletin.php>
3. Public Health Agency of Canada
Issues of FluWatch can be accessed at:
www.phac-aspc.gc.ca/fluwatch/
4. United States Centers for Disease Control and Prevention
<http://www.cdc.gov/flu/weekly/fluactivity.htm>
5. European Influenza Surveillance Scheme
http://www.eiss.org/cgi-files/bulletin_v2.cgi

INFORMATION ABOUT H1N1 INFLUENZA (HUMAN SWINE INFLUENZA)

1. CDC (Human swine flu investigation)
<http://www.cdc.gov/swineflu/investigation.htm>
2. PHAC (Human swine flu investigation)
http://www.phac-aspc.gc.ca/alert-alerte/swine_200904-eng.php
3. WHO Swine Flu general info
<http://www.who.int/csr/disease/swineflu/en/index.html>
4. Ontario Ministry of Health (Important Health Notices)
<http://www.health.gov.on.ca/english/providers/program/emu/ihn.html>

INFORMATION ABOUT AVIAN INFLUENZA

For latest information on the status of avian influenza worldwide please use the following link:

Public Health Agency of Canada
<http://www.phac-aspc.gc.ca/h5n1/index.html>

Influenza Surveillance Weeks 2009-2010 and date of submission of Appendix C

WEEKS	START	END	Appendix C Submission to MOHLTC
WK49	6-Dec-09	12-Dec-09	15-Dec-09
WK50	13-Dec-09	19-Dec-09	22-Dec-09
WK51	20-Dec-09	26-Dec-09	29-Dec-09
WK52	27-Dec-09	2-Jan-10	5-Jan-10
WK1	3-Jan-10	9-Jan-10	12-Jan-10
WK2	10-Jan-10	16-Jan-10	19-Jan-10
WK3	17-Jan-10	23-Jan-10	26-Jan-10
WK4	24-Jan-10	30-Jan-10	2-Feb-10
WK5	31-Jan-10	6-Feb-10	9-Feb-10
WK6	7-Feb-10	13-Feb-10	16-Feb-10
WK7	14-Feb-10	20-Feb-10	23-Feb-10
WK8	21-Feb-10	27-Feb-10	2-Mar-10
WK9	28-Feb-10	6-Mar-10	9-Mar-10
WK10	7-Mar-10	13-Mar-10	16-Mar-10
WK11	14-Mar-10	20-Mar-10	23-Mar-10
WK12	21-Mar-10	27-Mar-10	30-Mar-10
WK13	28-Mar-10	3-Apr-10	6-Apr-10
WK14	4-Apr-10	10-Apr-10	13-Apr-10
WK15	11-Apr-10	17-Apr-10	20-Apr-10
WK16	18-Apr-10	24-Apr-10	27-Apr-10
WK17	25-Apr-10	1-May-10	4-May-10
WK18	2-May-10	8-May-10	11-May-10
WK19	9-May-10	15-May-10	18-May-10
WK20	16-May-10	22-May-10	25-May-10
WK21	23-May-10	29-May-10	1-Jun-10
WK22	30-May-10	5-Jun-10	8-Jun-10
WK23	6-Jun-10	12-Jun-10	15-Jun-10
WK24	13-Jun-10	19-Jun-10	22-Jun-10
WK25	20-Jun-10	26-Jun-10	29-Jun-10
WK26	27-Jun-10	3-Jul-10	6-Jul-10
WK27	4-Jul-10	10-Jul-10	13-Jul-10
WK28	11-Jul-10	17-Jul-10	20-Jul-10
WK29	18-Jul-10	24-Jul-10	27-Jul-10
WK30	25-Jul-10	31-Jul-10	3-Aug-10
WK31	1-Aug-10	7-Aug-10	10-Aug-10
WK32	8-Aug-10	14-Aug-10	17-Aug-10
WK33	15-Aug-10	21-Aug-10	24-Aug-10
WK34	22-Aug-10	28-Aug-10	31-Aug-10
WK35	29-Aug-10	4-Sep-10	7-Sep-10

APPENDIX - I

Definitions for influenza activity levels:

No Data: No activity report corresponding to the surveillance week was received at the Ministry of Health and Long-Term Care Call Centre by the Tuesday (at 4 p.m.) following the end of the surveillance period.

No Activity: **No laboratory-confirmed* influenza and NO outbreaks detected** within the health unit/ influenza surveillance area, within the prior week, although sporadically occurring ILI may or may not be present.†

Sporadic: Sporadically (infrequently) occurring **ILI and at least one lab-confirmed influenza* case with NO outbreaks** detected within the health unit area.†

Localized: sporadically occurring **ILI and lab-confirmed influenza* together with outbreaks of ILI** in schools§ and work sites, or laboratory-confirmed influenza in residential institutions occurring in < 50% of the health unit. Outbreaks affect a single and/or adjacent geographic area within the health unit jurisdiction, e.g. outbreaks in a nursing home and a school in close proximity to each other.†

Widespread: sporadically occurring **ILI and lab-confirmed influenza* together with outbreaks of ILI** in schools and work sites, or laboratory-confirmed influenza in residential institutions occurring in > 50% of the health unit. Outbreaks affect multiple and non-adjacent geographic areas within the health unit jurisdiction, such as two or more regions of the health unit, two or more municipalities, two or more electoral wards, etc.†

* Confirmation of influenza within the surveillance region at any time within the prior week

† Sub-regions within the province or territory as defined by the provincial/territorial epidemiologist

§Health units have been requested to consider laboratory confirmed pH1N1 outbreaks in camps in their region when evaluating ILI activity levels

Influenza-Like Illness (ILI) Definitions:

A) ILI in the general population:

Acute onset of respiratory illness with fever and cough and with one or more of the following - sore throat, arthralgia, myalgia, or prostration which could be due to influenza virus. In children under 5, gastrointestinal symptoms may also be present. In patients under 5 or 65 and older, fever may not be prominent.

B) ILI/Influenza outbreaks:

Schools and work sites: greater than 10% absenteeism on any day, most likely due to ILI.

Residential institutions: two or more cases of ILI within a seven-day period, **including at least one laboratory confirmed case.**

Current Provincial Surveillance Case Definition for pH1N1 (as of May 5, 2009):

Confirmed

Person with or without Influenza-like illness¹ and

Laboratory confirmation of swine influenza A (H1N1) virus infection by one or more of the following tests:

- RT-PCR with genotyping of H1 and/or N1 swine influenza virus
- Viral culture with strain typing
- Four-fold rise in swine influenza A(H1N1) virus specific antibodies by serology testing

¹Influenza-like illness: Acute onset of respiratory illness with fever AND one or more of the following - cough, sore throat, arthralgia, myalgia, prostration, or malaise. In cases under 5 or 65 and older fever may not be prominent.